

**CE 435/535 – Spring 2008**

Homework #1 (Due Tues. January 29th)

A few of your homework assignments this semester will focus on the design of a P/C bridge. As a prelude to this, you need to become familiar with various components of a typical bridge. This HW assignment is intended to do that and give you a feel for the relative dimensions of the components of a bridge.

- a) Visit a prestressed concrete bridge site that is constructed with AASHTO Girders and report some of the physical measurements of the structure in the table given below. Make sure you find a bridge that is constructed with AASHTO Girders; there are several such bridges in and around Tucson.
- b) Provide a sketch (or picture) of the bridge showing the measurements that you have taken.
- c) Provide a sketch (or picture) of the traffic barriers and show its dimensions.

Team Members:	
1)	
2)	
3)	
Bridge Location	
Number of Spans	
Length of Each Span	
Total Length of Bridge (ft)	
Angle of Skew (degrees)	
Pier Cap W x H x L (ft)	
Number & Height of Columns per Bent	
Diameter or Side Dimensions of Columns (in.)	
Girder Type	
Girder Spacing (ft)	
Thickness of Slab (in.)	
Diaphragm Thickness (in.)	
No. of Diaphragms per Span	
How far above the bottom of the girder does the diaphragm end?	

For this homework, you may work in teams of two or three. Please be careful and practice common sense safety rules. By agreeing to visit the site and taking these measurements you are taking full responsibility for your safety. If for safety reasons, you wish not to participate in this homework, please let me know.

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### Homework #2 (Due Tues. February 5th)

A four span bridge is to be constructed with Type VI AASHTO Girders. The girders are to be designed as simply supported for dead load and made continuous for live loads. The live load consists of AASHTO HS20-44 truck loading. The exterior girder supports the traffic barriers on one side. The barriers are made of concrete and are 32 in. high. The barriers are 6 in. thick at the top and taper on one side to a thickness of 18 in. at the base.

- Using the ultimate strength method with the load factors specified by AASHTO, design a typical interior and cantilever portion of the deck slab. Give a complete sketch of the final design, showing the top and bottom reinforcement in both directions, similar to the sketches that are provided below.
- Calculate the dead load for a typical interior girder.
- Draw the dead load shear and moment diagrams for each beam; this information will be used later on when you will be designing the girder.

#### Given:

girder spacing:	8'-0" and a 3'-3" of cantilever
span:	4 @ 100 feet
angle of skew:	18 degrees
diaphragms:	8 in. thick; @third points going from top to 8 in. Above bottom of girders
deck thickness:	8 in.
deck cover concrete:	2 in. for top bars, 1 in. for bottom bars
Concrete Strength:	
deck slab:	4500 psi
AASHTO Girders:	$f'_{ci} = 5000$ psi; $f'_c = 6000$ psi
prestressing strand:	1/2 in. - 270 K, 7-Wire, Low Relaxation
non-prestressed steel:	
#6 and smaller:	$f_y = 40$ ksi
#7 and larger:	$f_y = 60$ ksi

